Climatology of Extratropical Cyclones

Jim Steenburgh

University of Utah

Jim.Steenburgh@utah.edu

Supplemental Reading: Lackmann (2011) Chapter 5
through Section 5.2

Class Activity

- On the whiteboard projection of the slide that follows identify:
  - Where cyclones are most common (Green Marker)
  - Where cyclogenesis is most common (Red marker)
  - Where cyclolysis is most common (Blue Marker)

- Do not look at the slides that follow

- Explain your thinking to Jim

Group Project

mapsforfree.com
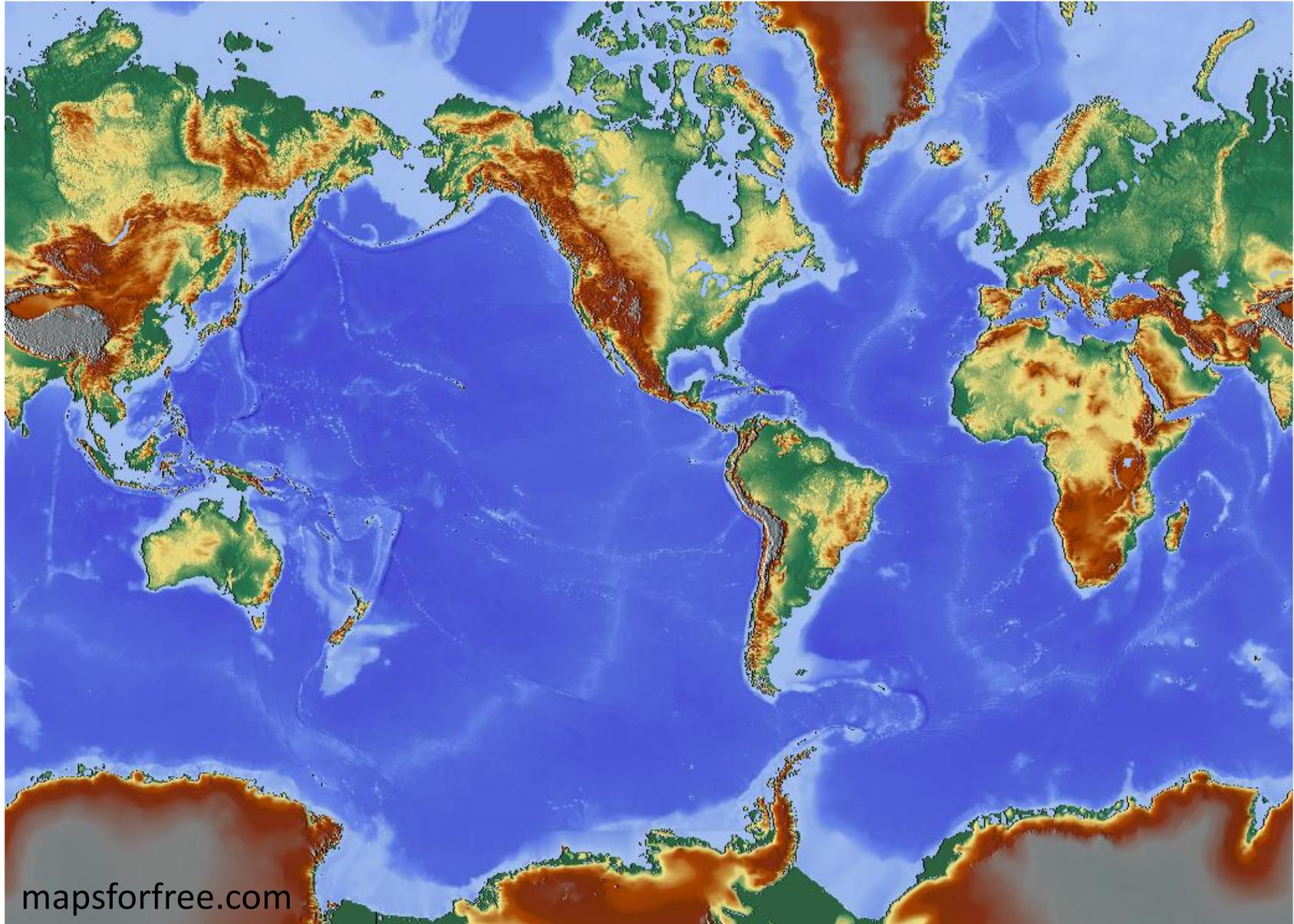
NH Mean Cyclone Frequencies (%)

Boreal Fall
(SON)

Wernli and Schwierz (2006)
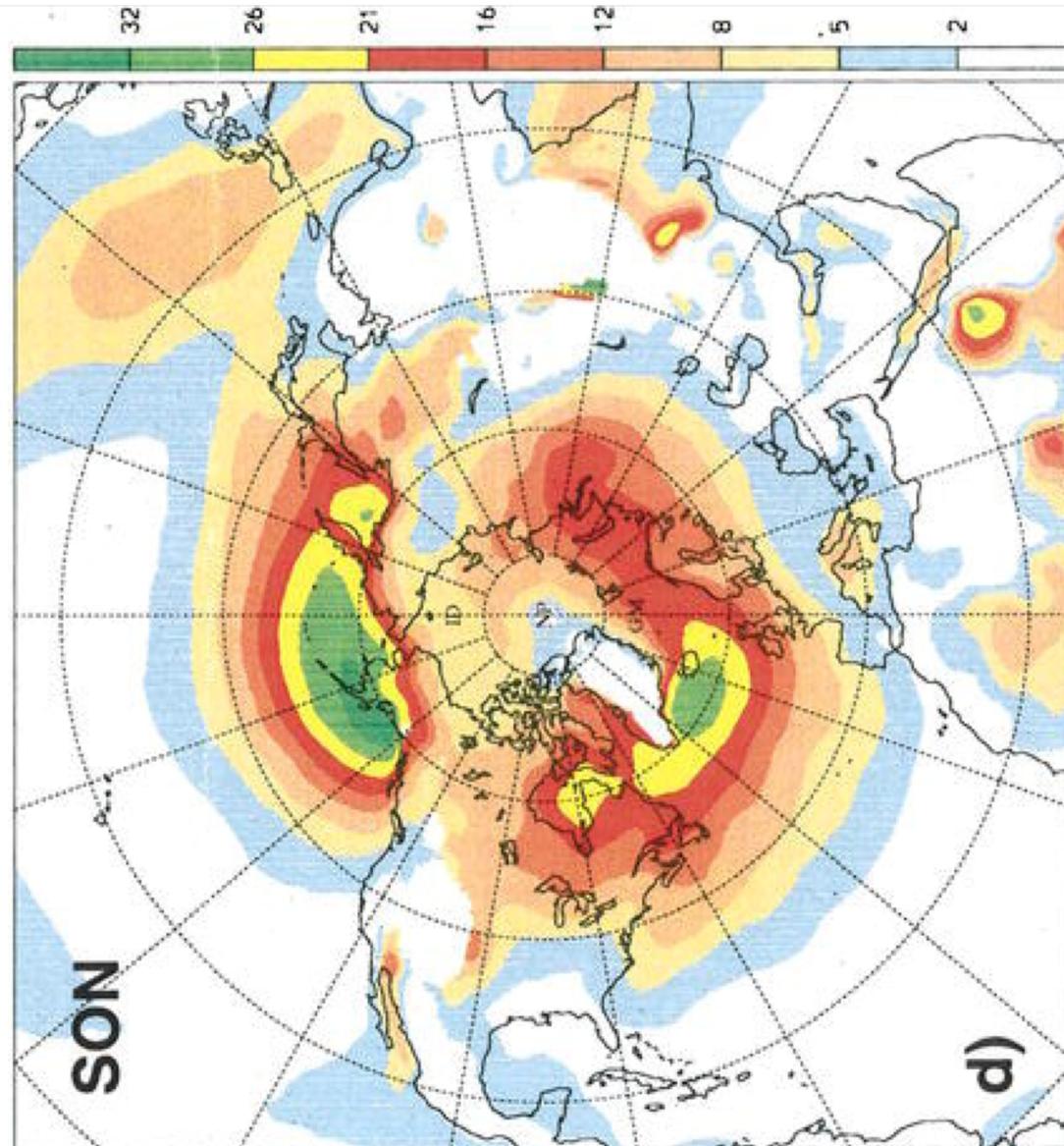
NH Mean Cyclone Frequencies (%)

Boreal Winter
(DJF)

Wernli and Schwierz (2006)
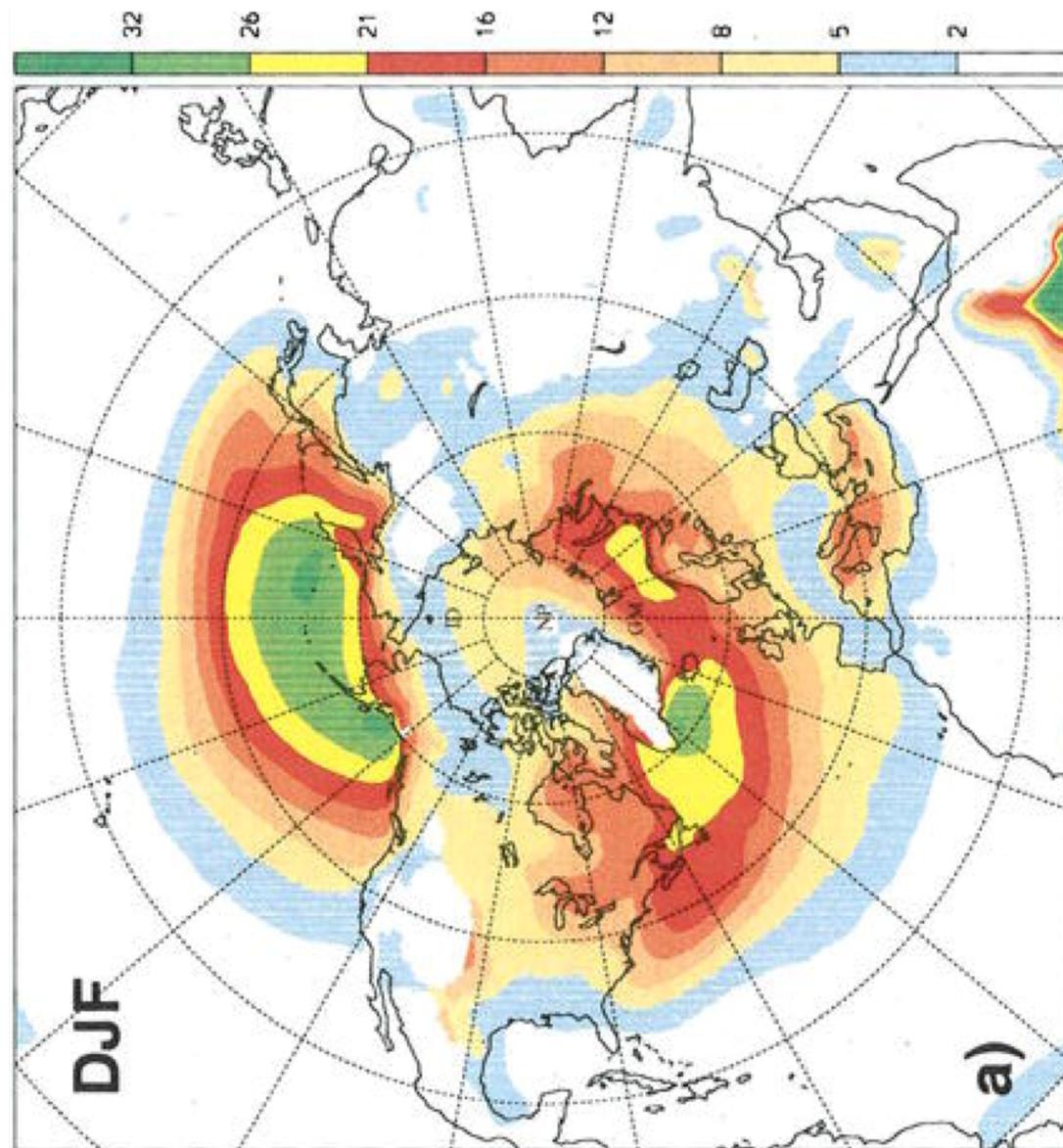
NH Mean Cyclone Frequencies (%)

Boreal Spring
(MAM)

Wernli and Schwierz (2006)
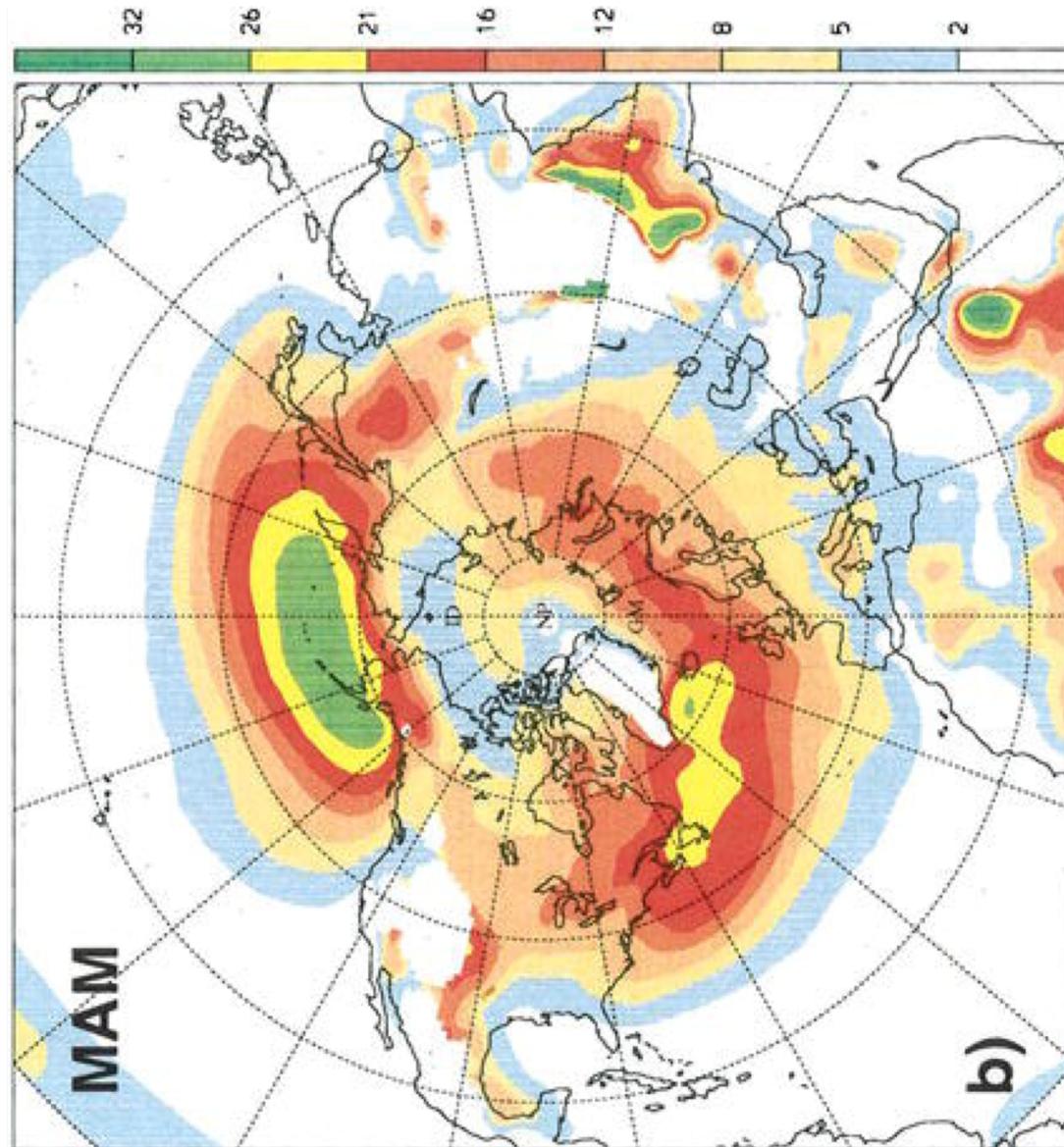
NH Mean Cyclone Frequencies (%)

Boreal Summer
(JJA)

Wernli and Schwierz (2006)
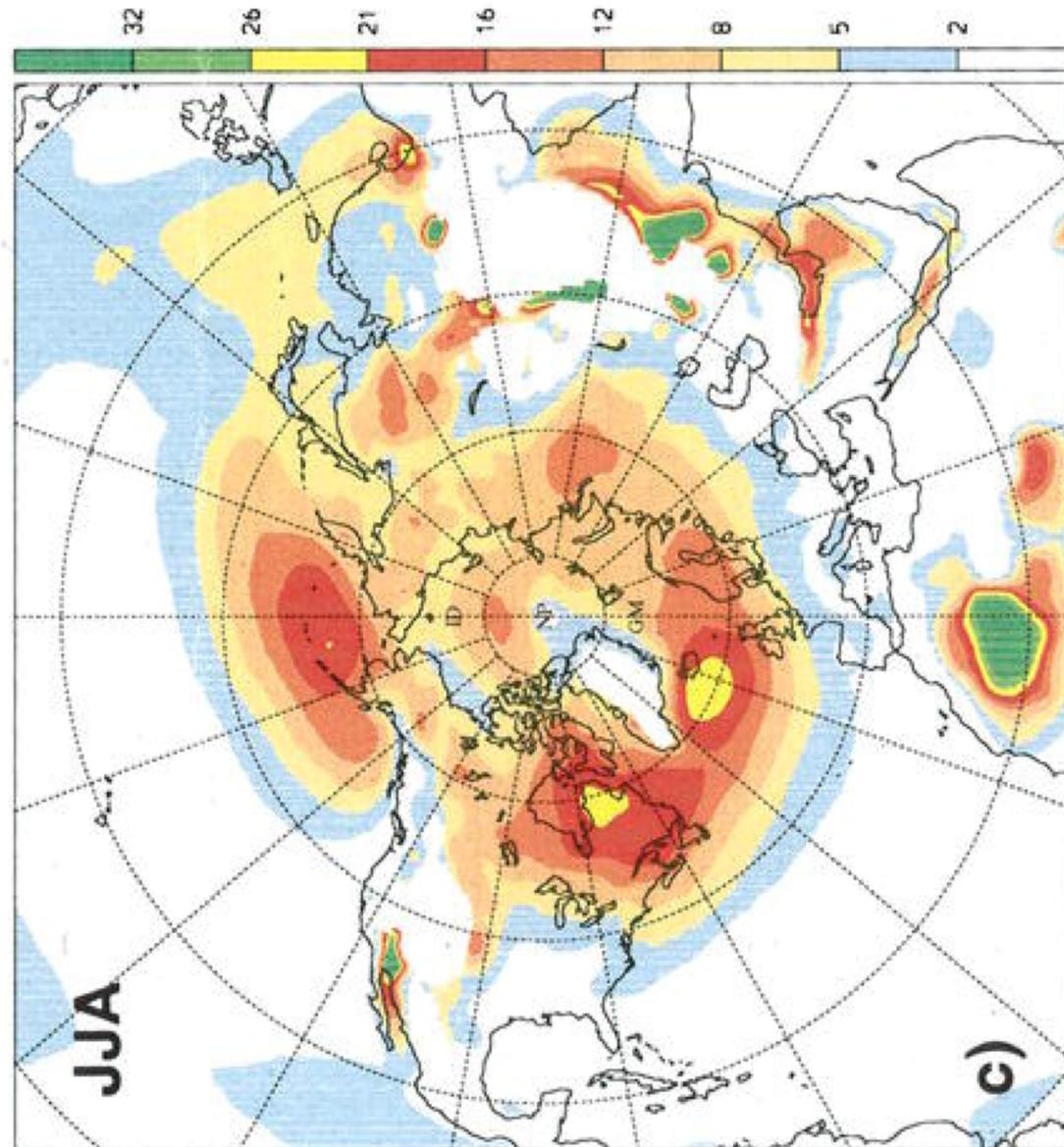
# SH Mean Cyclone Frequencies (%)

Austral Winter (JJA)
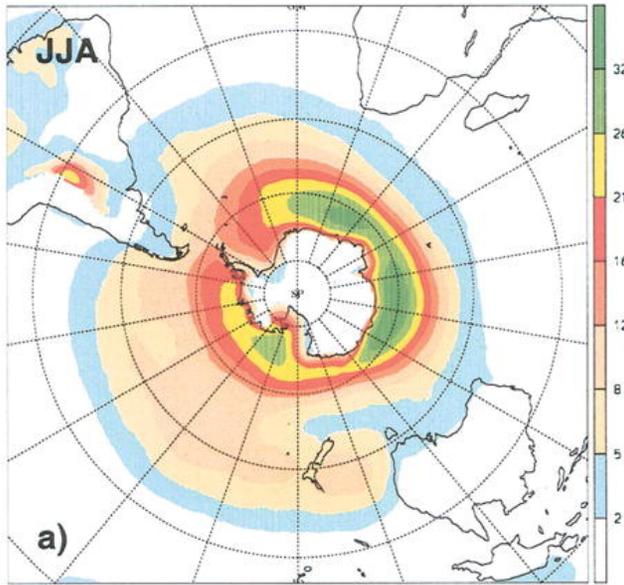
Austral Spring (SON)
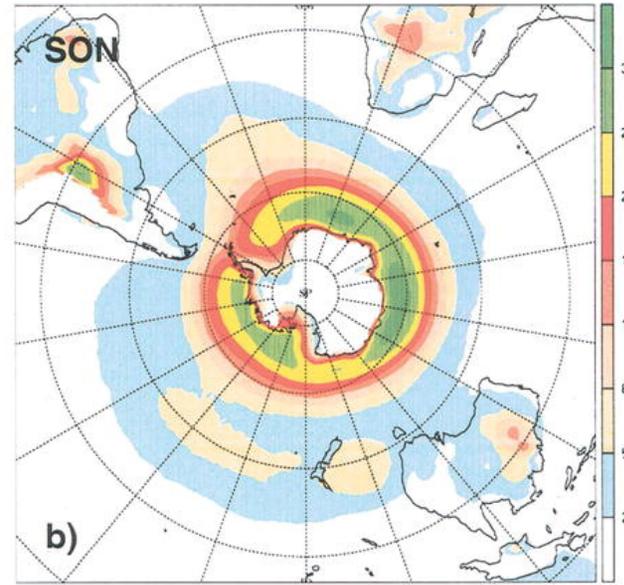
Austral Summer (JJA)
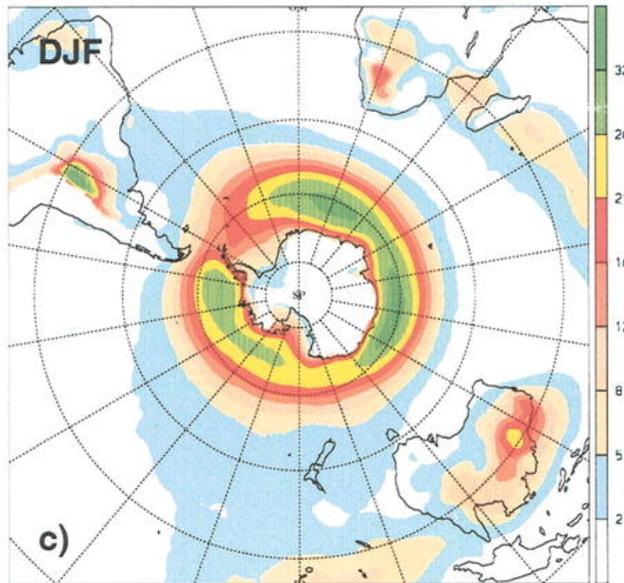
Austral Fall (MAM)
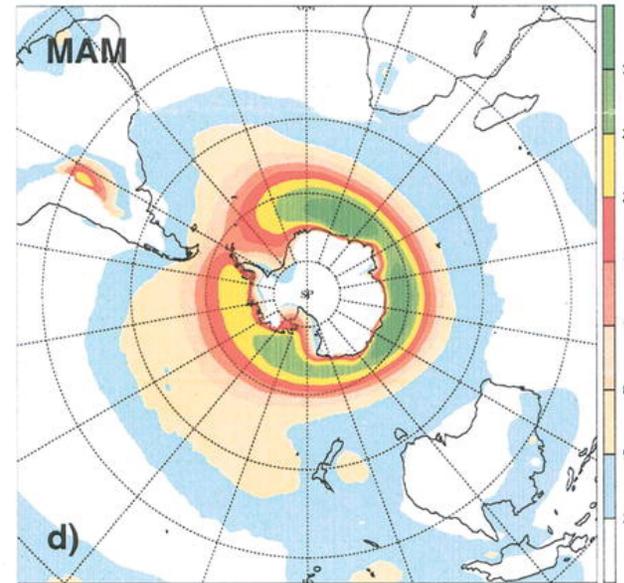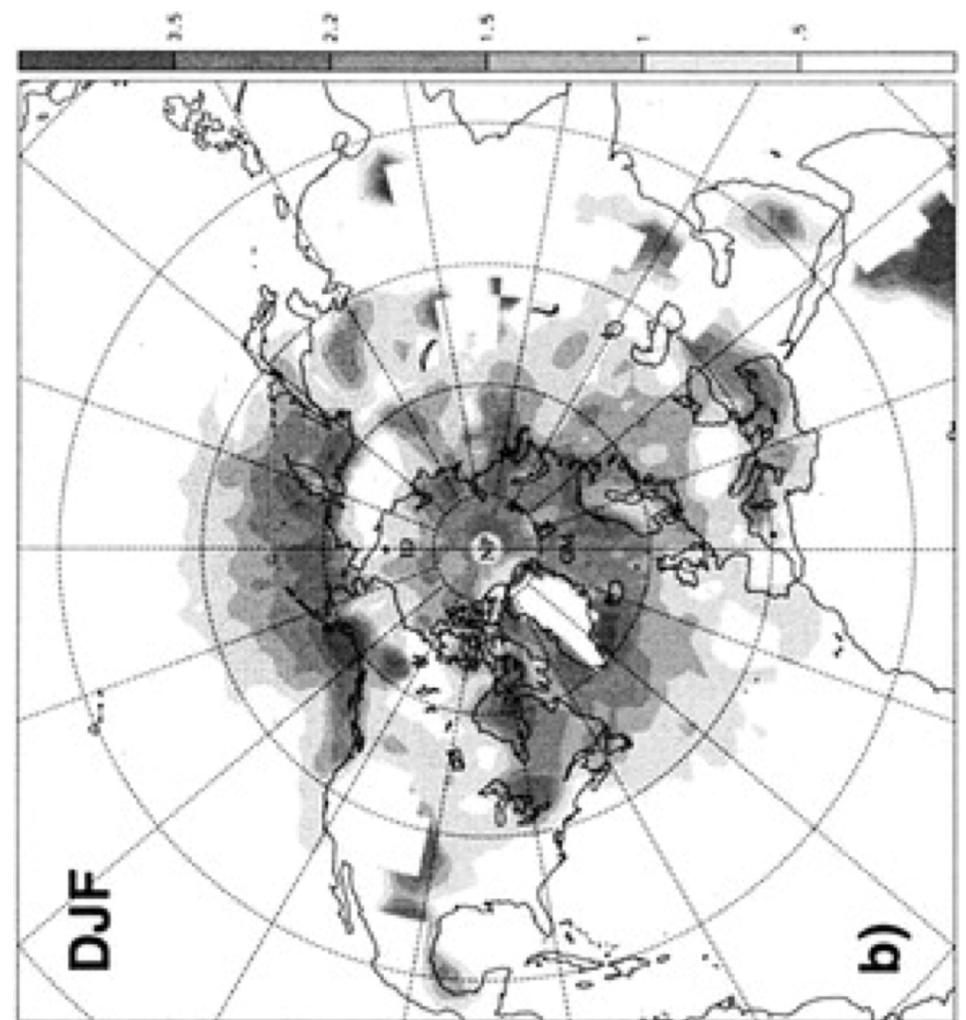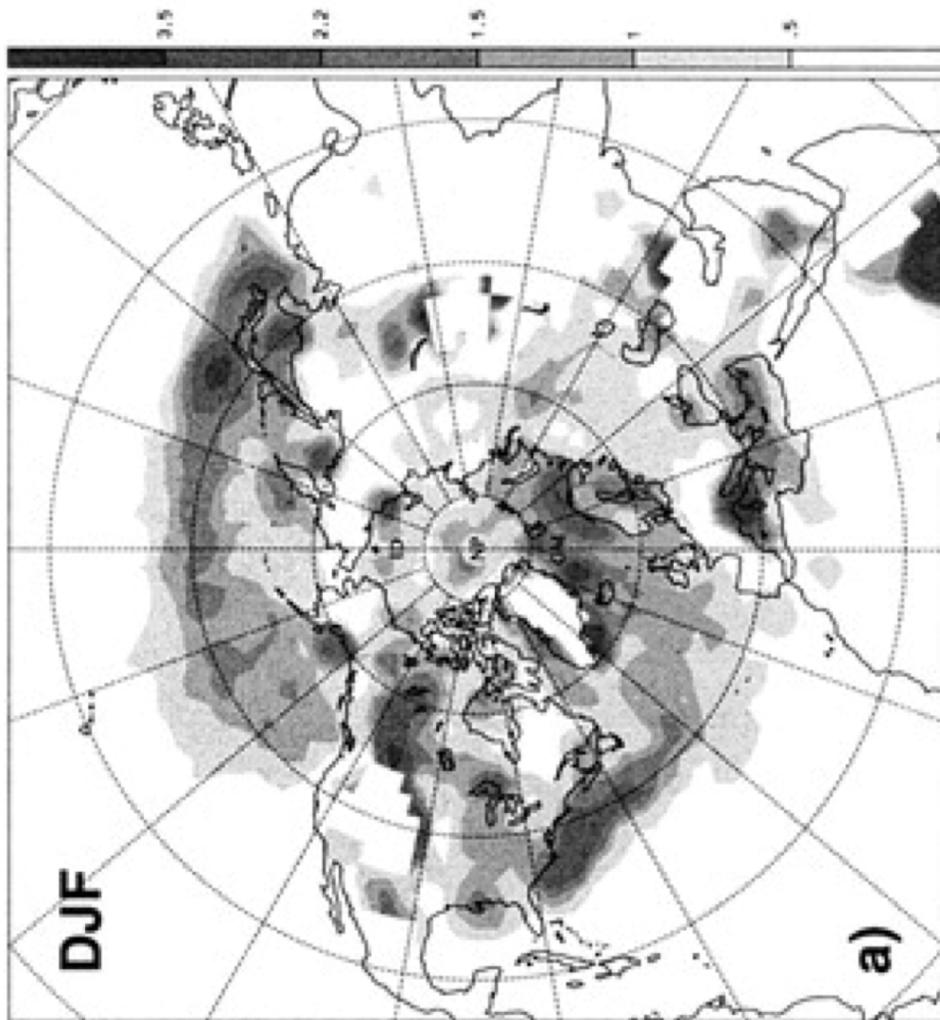
Wernli and Schwierz (2006)

NH Winter

Genesis Frequency

Lysis Frequency

Wernli and Schwierz (2006)

Another Perspective

(c) Genesis Density

Colorado
Alberta
Himalaya
Intermountain?
Greenland
Alps/Genoa

(d) Lysis Density

Hoskins and Hodges (2002)

SH Winter

Genesis Frequency　　　Lysis Frequency

Wernli and Schwierz (2006)

Another Perspective

Genesis

Lysis

Hoskins and Hodges (2005)
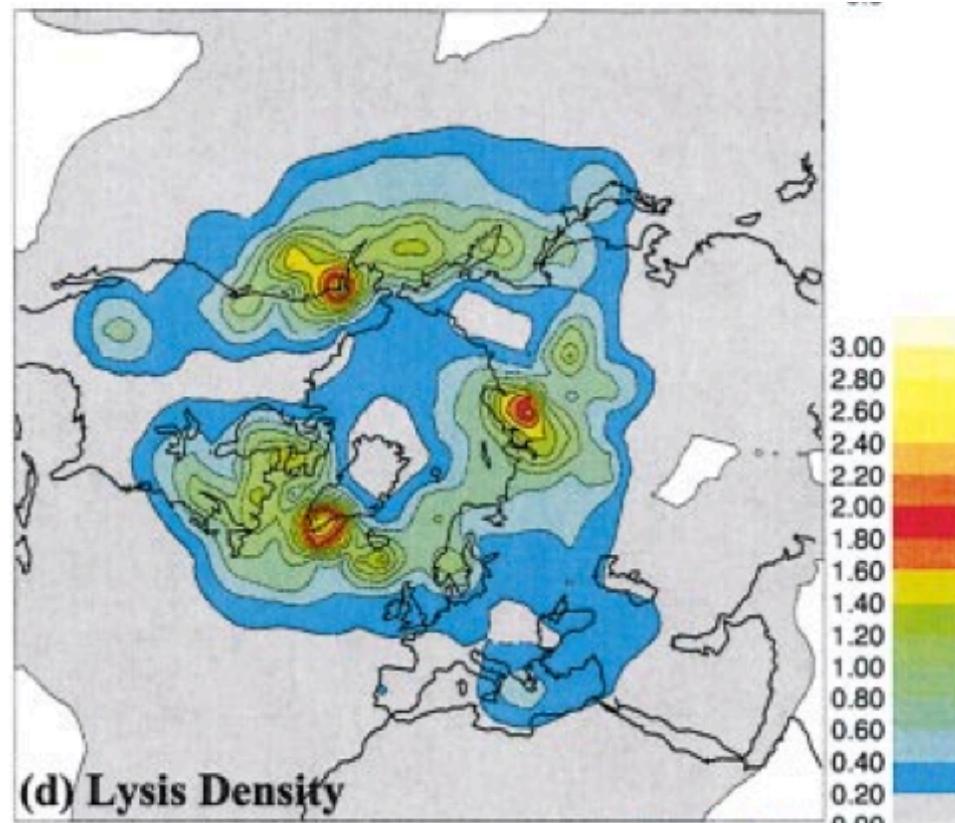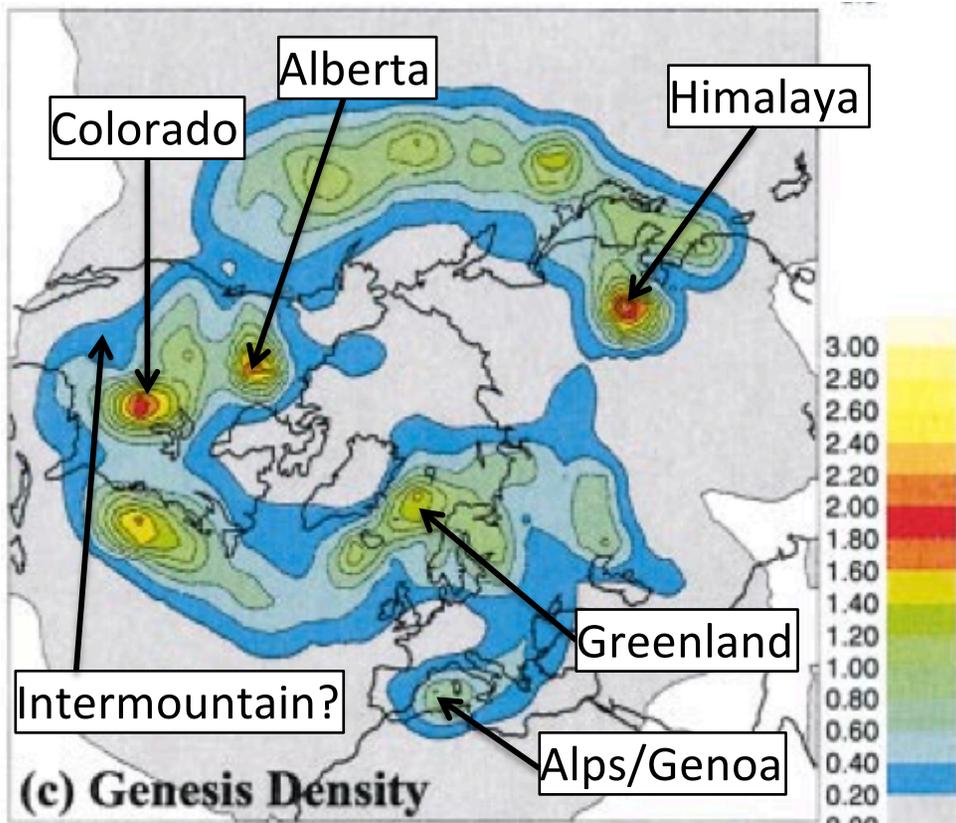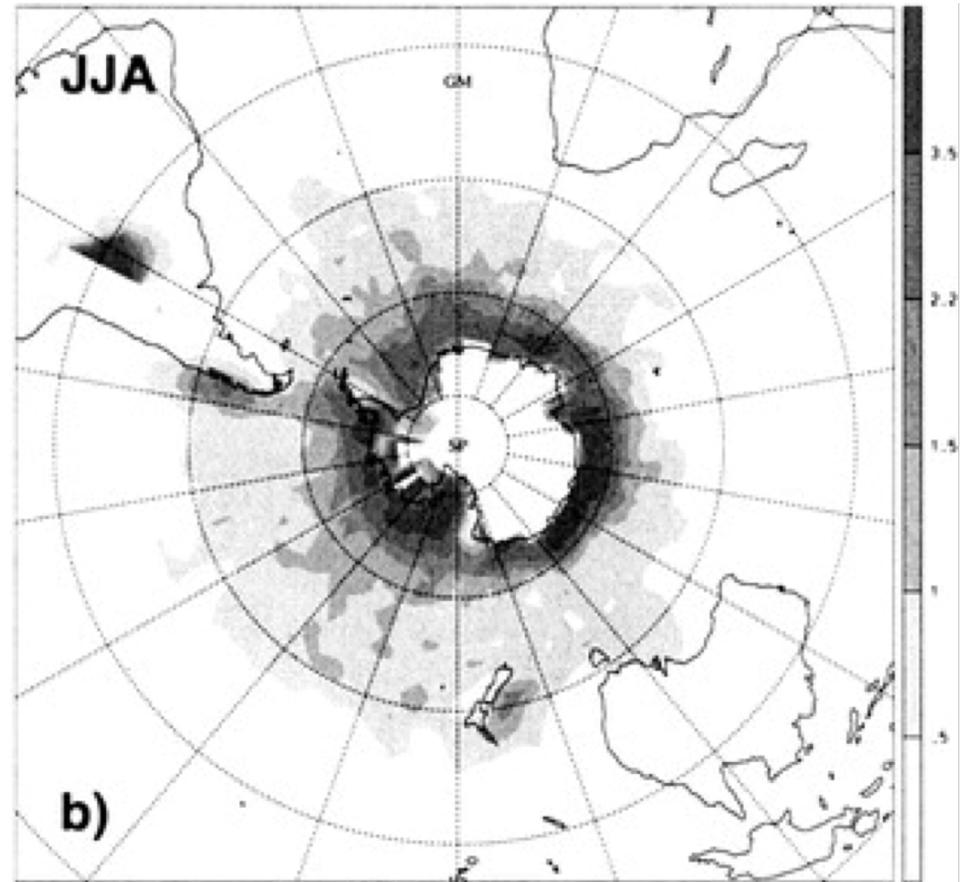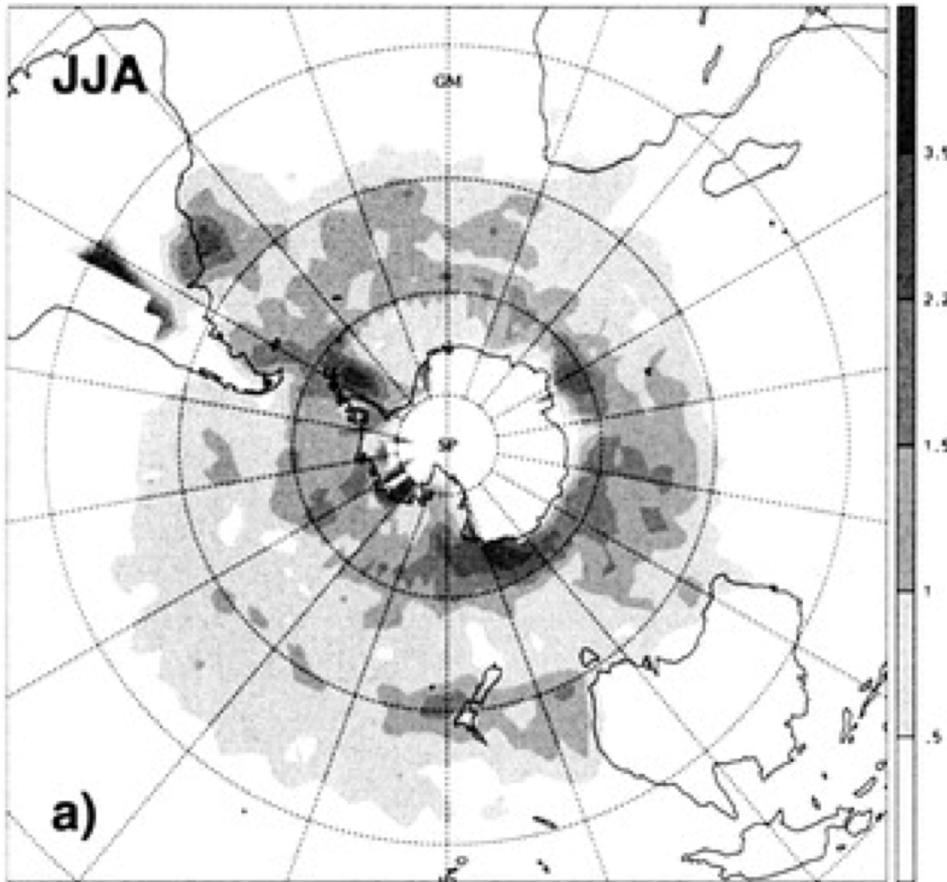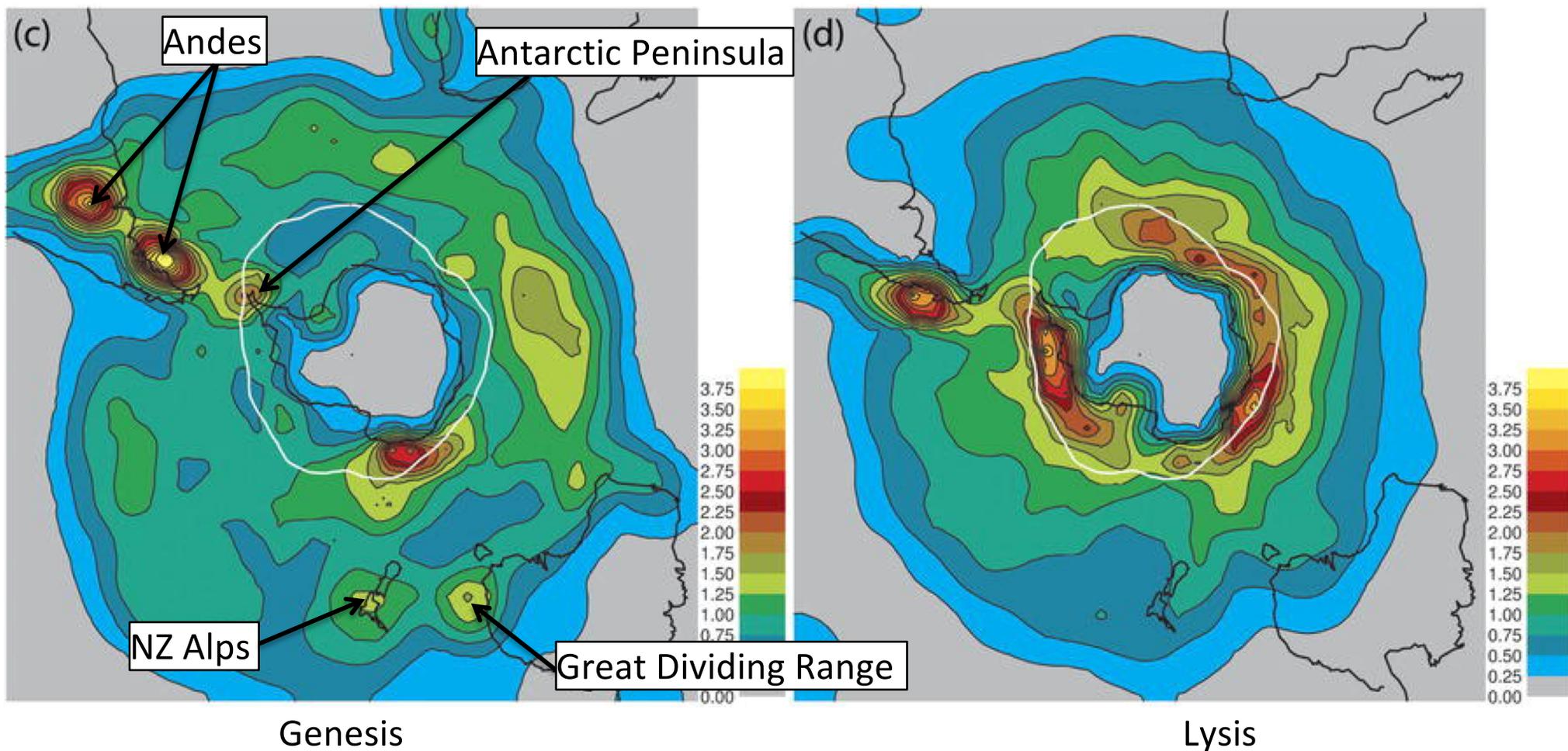
NA Jan Cyclone Events and Variability

Zishka and Smith (1980)
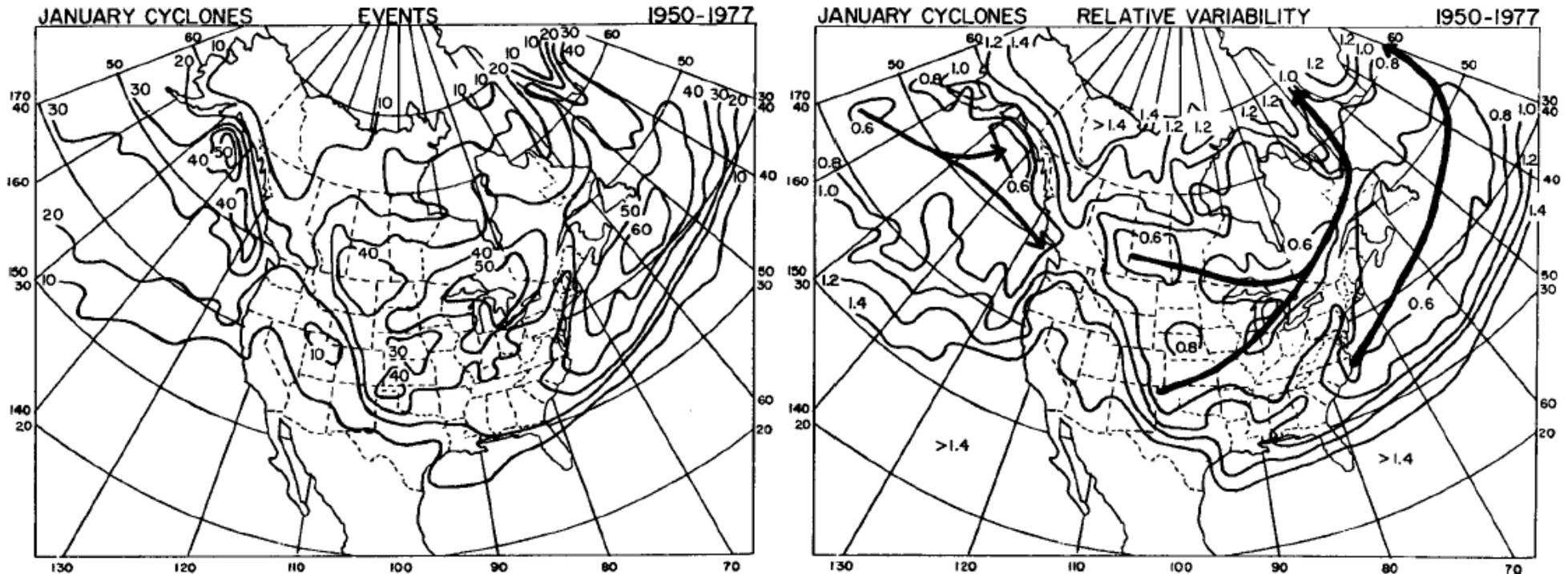
NA Jan Genesis and Lysis

Zishka and Smith (1980)
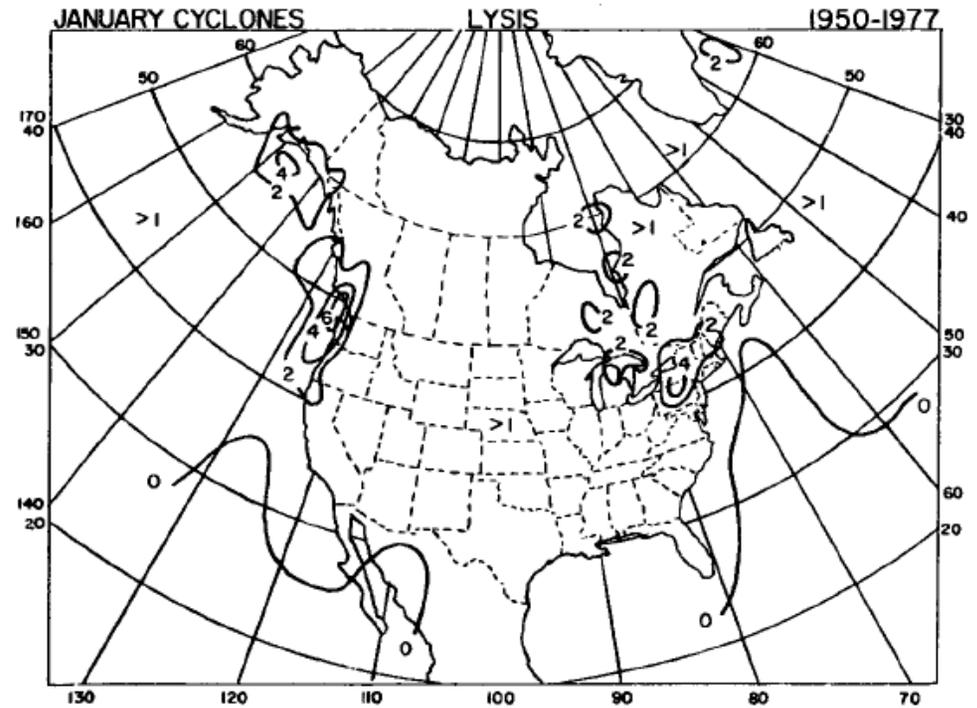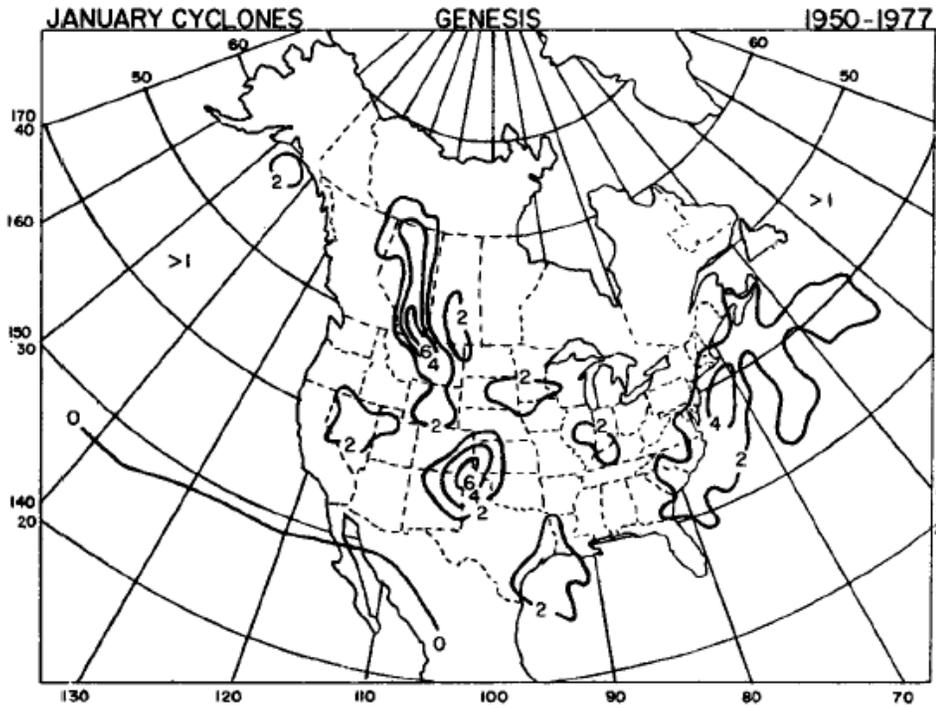
NA July Cyclone Events and Variability

Zishka and Smith (1980)
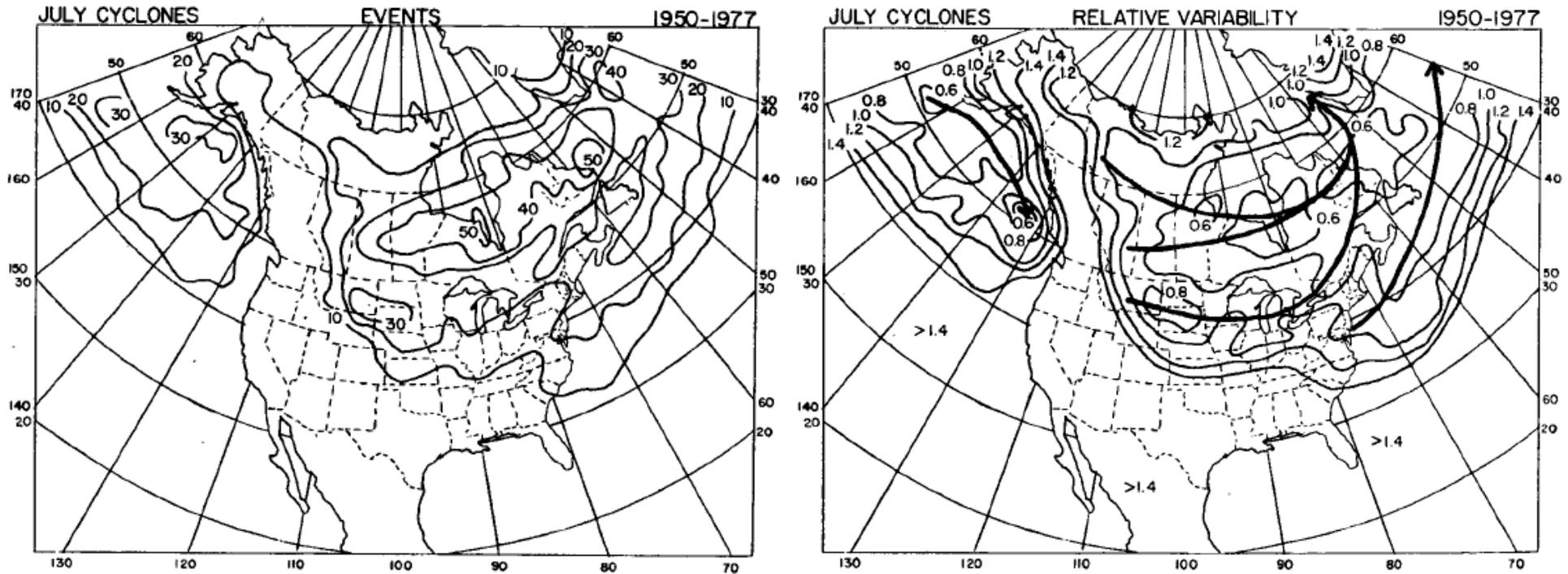
NA July Genesis and Lysis

Zishka and Smith (1980)
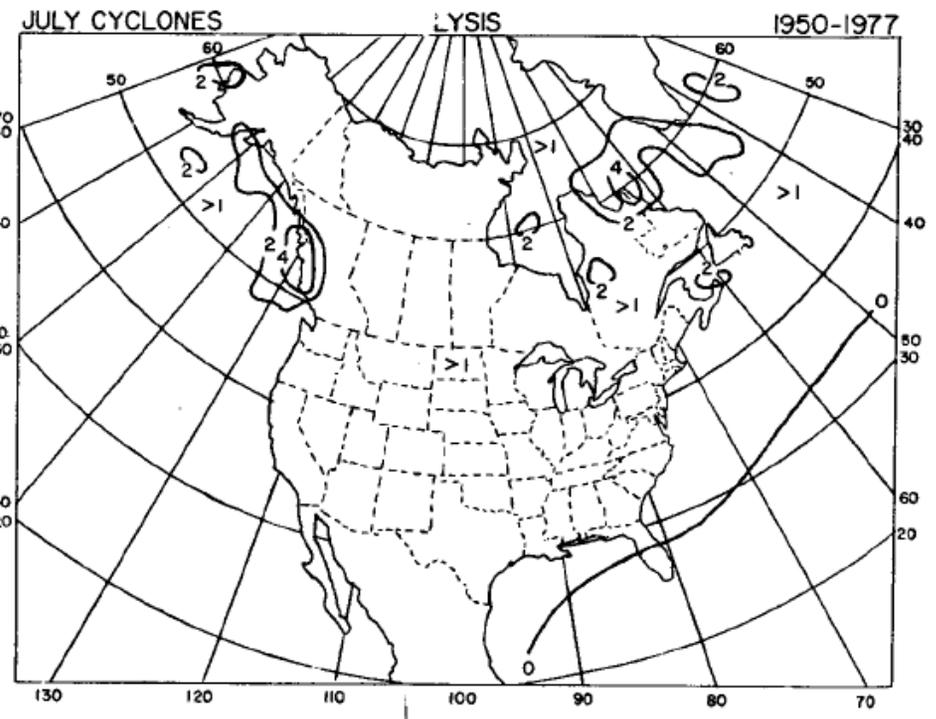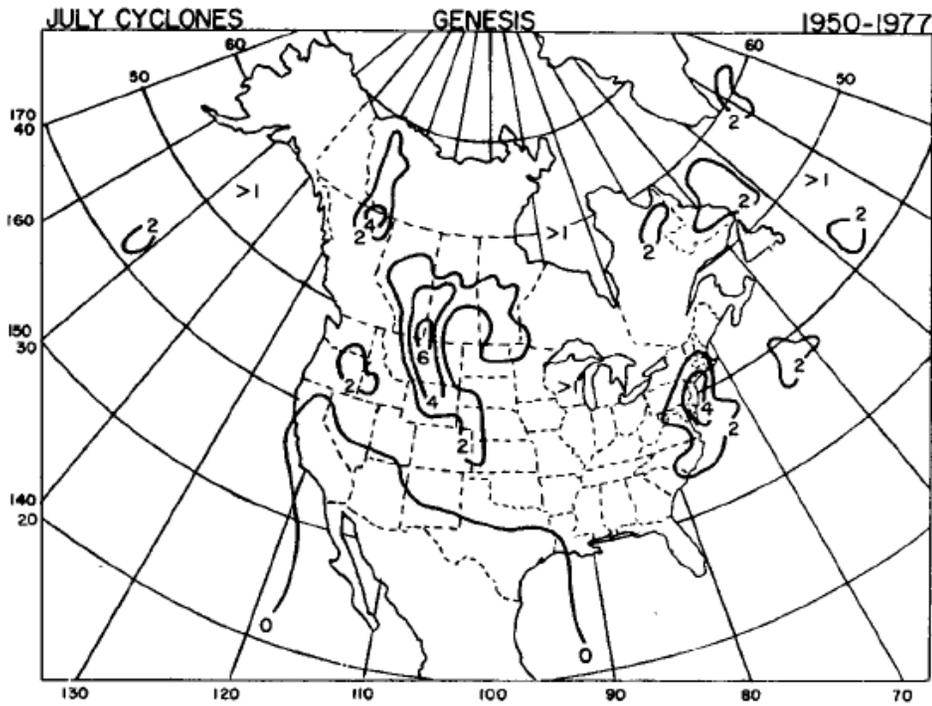
# Mesoscale Terrain Effects

Chung et al. (1976)
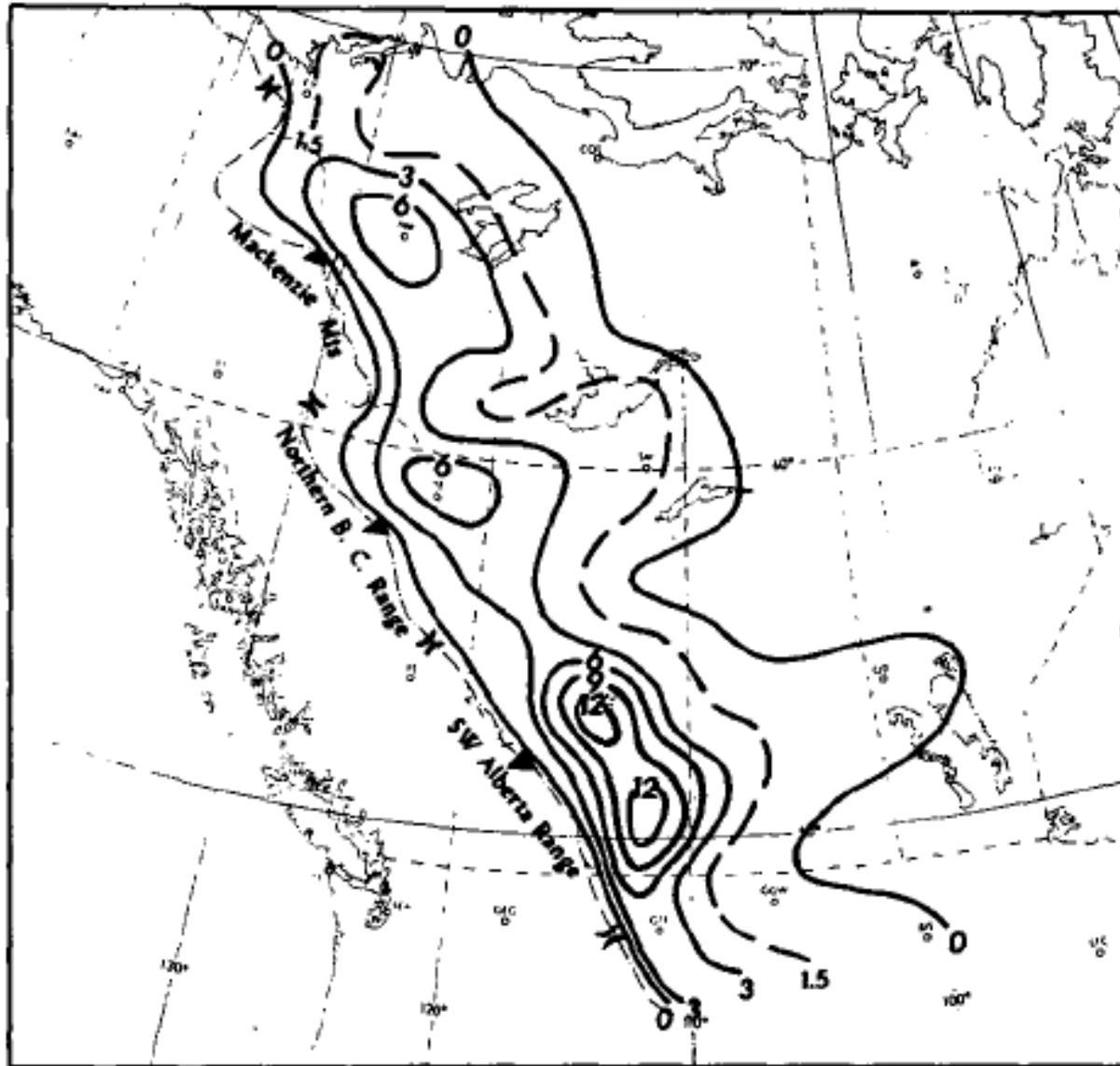
# Intermountain Cyclones

Cyclone Density   IC-Genesis

ERA

NARR

a) ERA-Interim 850-hPa cyclone density

a) ERA-Interim 850-hPa genesis density

b) NARR 850-hPa cyclone density

b) NARR 850-hPa genesis density

Jeglum et al. (2010)

Seasonality

Jeglum et al. (2010)

Seasonality

Jeglum et al. (2010)
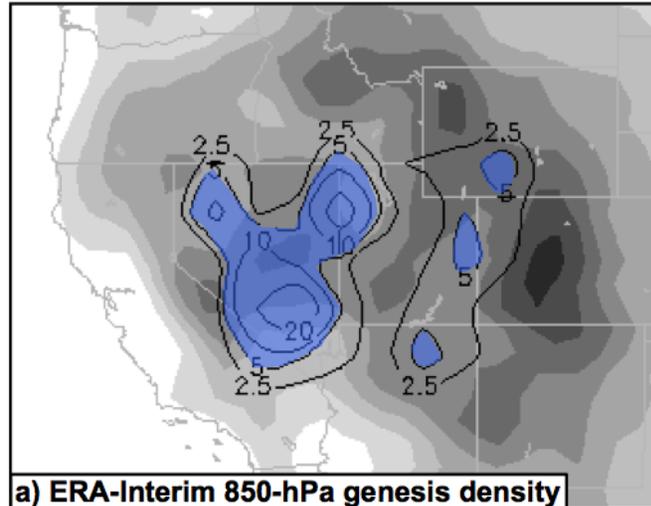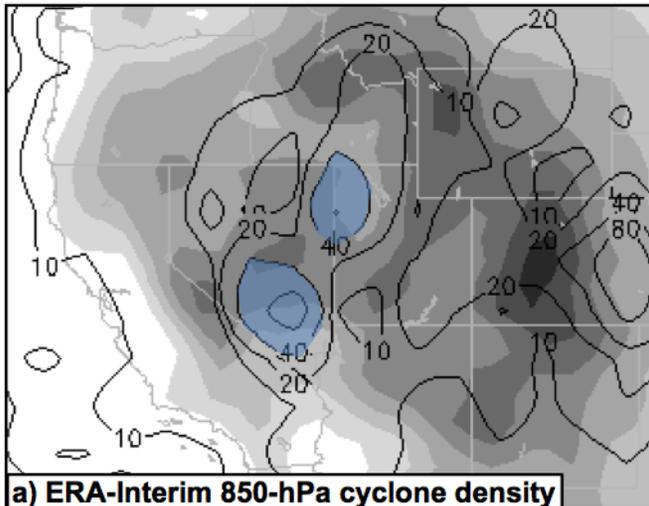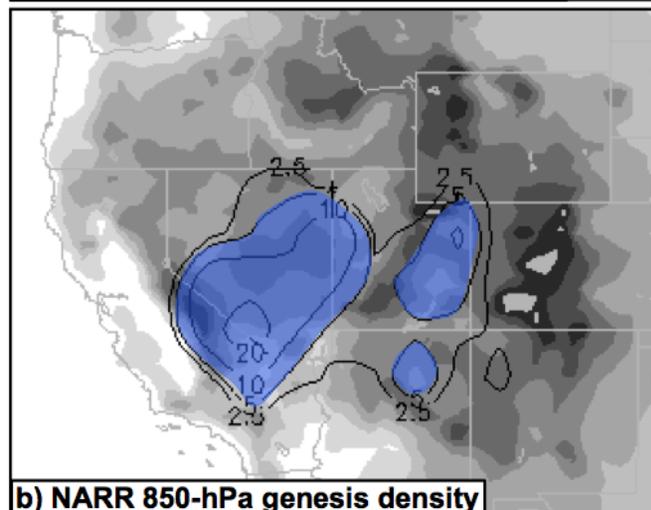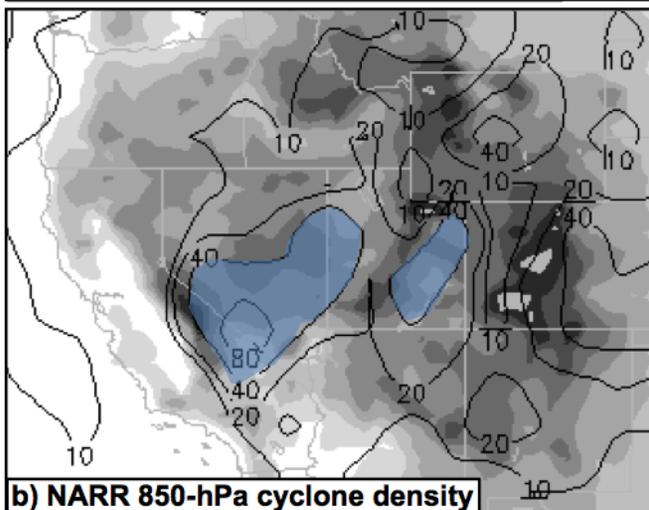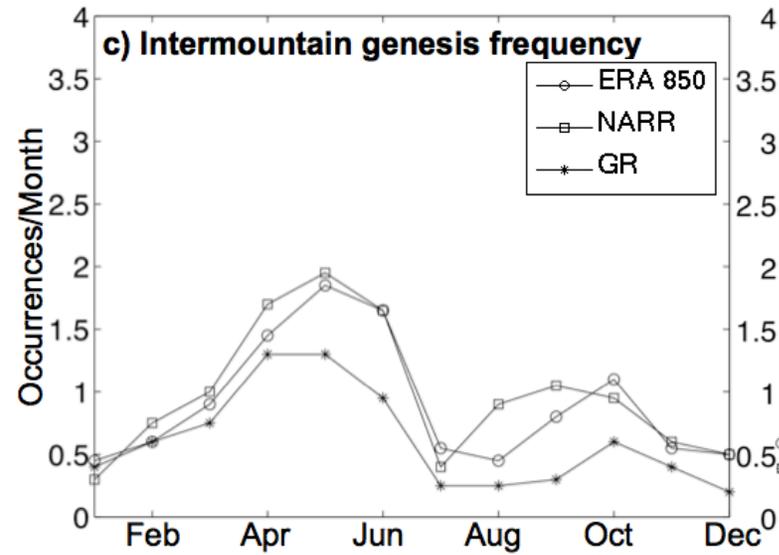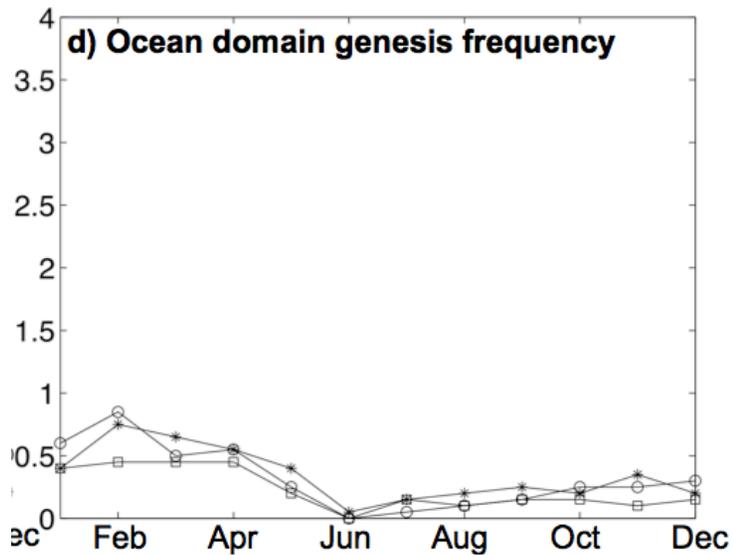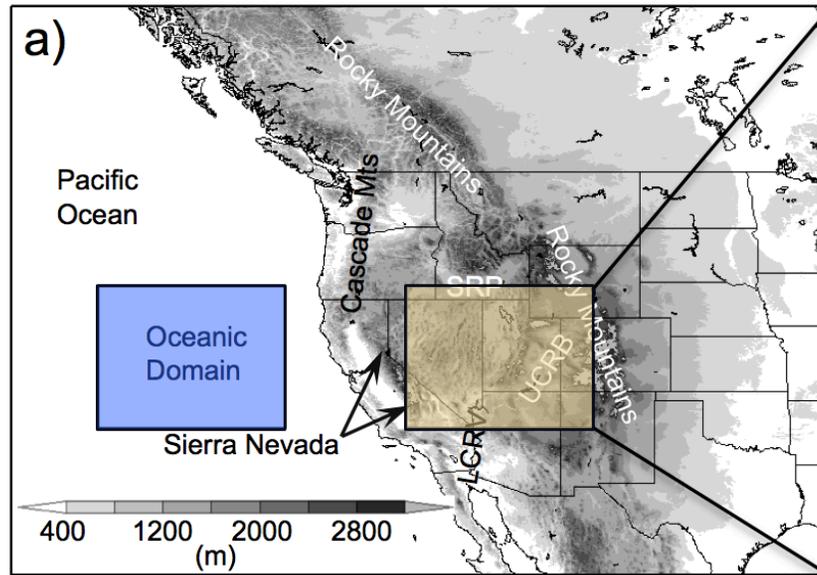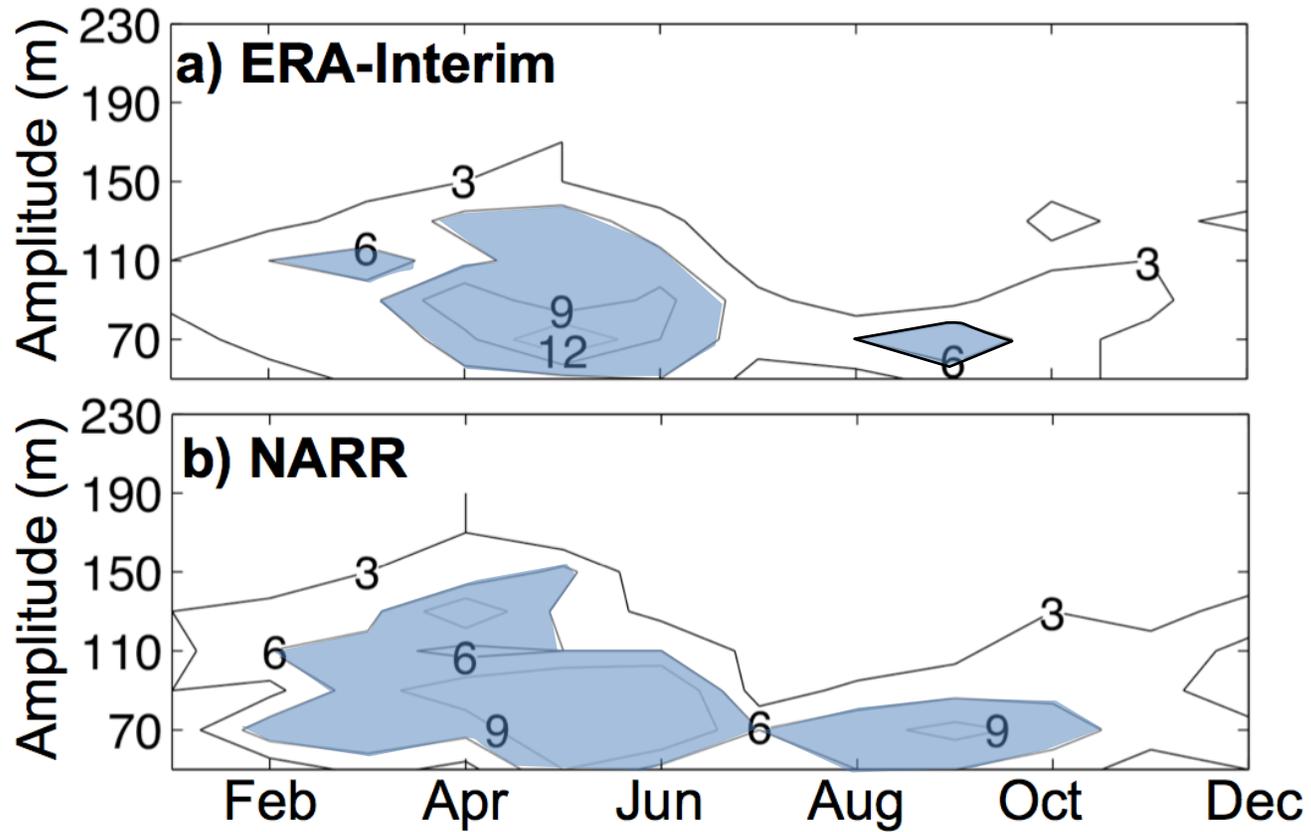
Class Activity

- Open the IDV bundle "Bundles -> Real-Time-WX -> Analyses -> Global-10day"

- Focusing on the past 5 days, use the IDV drawing control to put an an "L" on every low center over the Northern Hemisphere (delete the pressure option so that there are only Ls)

- How do these locations and tracks compare to the climatological expectations?

- Explain departures